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COVID-19 impact on dairy sector: The mediating role of knowledge sharing and trust on innovation capability

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Background: In the current era, innovation has become the basis for the success of all industries. In reality, fast innovation facilitated by rapidly changing technological discoveries is critical to global economic progress.

Aim: The primary goal of this article is to examine the effect of knowledge exchange and development of supervisory support, trust, training, information technology, and industrial cluster resources on innovation capabilities in the dairy sector of Pakistan.

Setting: From a total of 520 small and medium enterprise (SMEs) dairy farms, 227 owners and managers were carefully chosen to participate in the survey.

Method: The current study's research framework was based on the resources and diffusion of innovation perspective theories. The data were gathered from dairy farm owners and managers in Punjab, Pakistan. SmartPLS-SEM was used to examine the multivariate connection among the variables.

Results: The current research finds that training and development, supervisory assistance, and industrial cluster resources strongly influence knowledge sharing. Furthermore, trust has a favourable influence on innovative capabilities. However, the mediation effect of knowledge sharing (KS) did not support information technology (IT) training and development (T&D) and innovative capabilities (IC).

Conclusion: According to findings in the study, T&D as a form of learning connect employees through the sharing of new ideas, allowing the business to improve and the concept to be modified. This study found that supervisory assistance significantly impacts innovative capabilities and knowledge sharing.

Keywords: industrial cluster resources; knowledge sharing; information technology; trust; supervisory support; training and development; innovation capability.

Introduction

Furthermore, knowledge sharing (KS) is an advantage and an intangible asset that includes, but is not limited to, corporate databases, employment plans, policies, workers' knowledge, and intellectual capital (Obeidat et al. 2021). Many academics think that it is impossible to establish innovation capability without trust and information sharing. Furthermore, several information-sharing studies show that KS among employees promotes innovative capabilities (IC) (Lam et al. 2021). It is also suggested that information sharing is necessary for innovation capabilities, which are required for business expansion to increase a firm's productivity (Hau, Kim & Lee 2013). Various academics present evidence that employees' trust and incentives could improve information sharing to improve IC (Fulk & Yuan 2013). Therefore, the present study has proposed theoretical reasons for the link between information sharing and IC. The demand for dairy products is increasing in Pakistan due to a high-density population. Many people are interested in starting a dairy farm. Despite their best efforts, small dairy farm owners and current business executives are dissatisfied with the slow growth rate. Small businesses in Pakistan have a relatively short lifespan: dairy entrepreneurs must work extra hard to stay in business (Ullah, Kamal & Arfan 2016). Currently, 19% of dairy SMEs are less than five years old, and only 4% endure more than five years in Pakistan (SMEDAP 2014).

Moreover, SMEs contribute 30% of the country's GDP. In the study of Hussain et al. (2021) it is stated that 60% of Pakistan's small and medium-sized businesses are wholesale and retail, 20% in

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manufacturing, and 22% in social and personal services. According to the same poll, around 80% of Pakistan's non-agricultural labour force are in SMEs. Only some small and medium-sized firms export their goods to other nations, accounting for up to 25% of total exports. Many experts believe that the capacity to innovate, is far more vital to and favorable for small firms, particularly dairy businesses (Salimi 2021). As a result, the current study was carried out on dairy SMEs. Pakistan is an agricultural country, with half of the people working in the dairy industry through various small-scale companies (agriculture, cattle, fisheries, poultry, handicrafts, and manufacturing) (SMEDAP 2020).

In the period of knowledge economy, rapidly changing technology and an uncertain, dangerous, and volatile economic climate provide significant hurdles for small businesses, and company survival in the current era is difficult (Sarkar & Clegg 2021). In other words, innovation capabilities provide a chance to boost competitiveness and growth by serving as a source of inspiration to creative efforts in small businesses. During the coronavirus disease 2019 (COVID-19), Pakistan SMEs also had an impact in terms of association with industrial resources and a partial contribution from human resources (Hussain et al. 2022). Most studies highlighted that information technology (IT), training and development, industry clustering, and supervisory support (SS) will directly influence KS (Ullah et al. 2017; Widodo et al. 2022). In the organisation, the employees encouraged to share their knowledge with other workers, are more likely to innovate, resulting in an improved positioning of the firm's competitive advantage. In addition, according to Donate and Guadamillas (2015), innovation capabilities and KS are all about putting ideas into action through the discovery, development, testing, and evolution of new technologies, goods, services, and structures. However, in this study technology, training & development, and SS toward KS in the dairy sector of Pakistan are investigated.

According to prior research, IC catalyses the performance of SMEs and helps gain competitive advantages. Key aspects include incentive for KS within an organisational context to generate an exchange of thoughts that benefit everyone, which helps to improve innovation capabilities (Hornsby, Kuratko & Zahra 2002; Lin 2011; Saperstein, Fiszdon & Bell 2011). To decrease the threat of failure, these industries need to innovate in the future. The present study will investigate the impact of KS and confidence as a mediator with IC. Moreover, the current study was carried out in the Pakistani dairy SME sector. It shows a research need for development and training, IT, SS, industrial cluster resources (ICR), and innovative capacities in dairy SMEs through KS and trust mediators.

The article is organised as follows: the study starts with the literature review and hypotheses development, and we used literature reviews to establish the research framework and methodology. Then, the article presents the results, and finally, we close with the discussion and conclusion.

Literature review and hypotheses development

Innovation capability

Innovation capability is essential to improving trade and industrial situations for large and small, developed and underdeveloped countries. Similarly, IC is critical to the long-term success of all organisations (Chang, Liao & Wu 2017; Zou, Guo & Song 2017). Changes in the emerging organisation's environment, such as competition, sophisticated consumer needs, product life-cycle shortages, and growing technological advances, have transformed the competitive market foundations and standards, demonstrating that IC is dominant in achieving organisational success (Verganti & Shani 2016).

Knowledge sharing (KS) is a critical component in a well-established firm, particularly for businesses engaged in significant innovation projects. Due to the absorption capacity, the creation of concepts, new companies, and the growth of enterprises in pioneering goods may increase the modernisation in operations (Hogan & Coote 2014; Hogan et al. 2011). A company that is able to exchange information and knowledge is considered too rare, challenging, and distinctive for a rival to imitate. As a result, it has the potential to boost the company's IC. The current study also investigates if employees are encouraged to share their knowledge with other workers, are more likely to innovate, resulting in improved positioning regarding the firm's competitive advantage.

Trust is the most crucial aspect in defining the foundation of any knowledge-centered relationship established on norms, dependability, and precise facts. According to Lorenzen (2005, 2007), Fleig-Palmer and Schoorman (2011), a secure and trustworthy environment is required for the adequate development of any new knowledge or the proper execution of already existing knowledge, which will eventually contribute to innovation, based on research and development, which is the very foundation of knowledge. Its most natural state, trust, is a set of ideas and customs that binds an entire society, collected in a collaborative and consensual way among various community members (Fukuyama 1995).

Theoretical foundation

Research framework

The theoretical research framework establishes the interaction among independent, dependent, and mediator variables to arrive at the best solution to the issue statement, which is identified through literature studies and theories. Notably, the research framework offers a robust foundation for creating hypotheses and measuring the instruments utilised in the study (Sekaran 2006; Sekaran & Bougie 2011).

Organisations and businesses have transitioned from the old to the modern period. In today's world, IC is the only

way to survive. Innovation capability is a crucial source for organisational survival and growth (Feng, Sun & Zhang 2010; Villar, Alegre & Pla-Barber 2014). In an unpredictable environment IC is challenging to achieve when deprived of KS (Morgan, Katsikeas & Vorhies 2012; Svetlik, Stavrou-Costea & Lin 2007). This indicates that a company's IC is necessary to ensure its success. Academic studies are also needed to investigate the importance of KS to improve IC (Nielsen et al. 2011; Villar et al. 2014).

According to the diffusion innovation theory, the invention is a strategy that may help a contemporary business attain and establish itself. Innovation capability is typically described as the methods that enable a firm's knowledge to capitalise on new ideas and market opportunities to keep the company viable. According to the resource-based approach, trust, SS, T&D, IT used, and ICRs, which are unquantifiable resources of enterprises to achieve and acquire success in a company (Abimbola 2001; Barney 1991; Dhanaraj & Beamish 2003; Katsikeas, Leonidou & Morgan 2000). Knowledge exchange, T&D, SS, trust, motivation, the use of innovation capability and information technology (ICT), and ICRs are all seen as platforms on which enterprises may survive, prosper, and please their customers, in Figure 1 presented the research framework of the present study.

Hypotheses development

Industry cluster resources and knowledge sharing

Many theorists and researchers agree that industrial clusters boost innovation capacity (Bruton, Dess & Janney 2007; Gnyawali & Srivastava 2013; Phelps 2010; Zhang & Li 2010). As a result, it is straightforward to conclude that industrial clusters save firms significant money, while boosting their internal and external resources. Forming industrial groups on a broader scale brings employees from various businesses together to exchange their knowledge and ideas, which helps to boost overall creative corporate performance, and capacity (Kotler & Armstrong 2011). As a result, establishing industrial clusters ensures a steady supply of skilled personnel, up-to-date knowledge, and approaches that contribute to superior performance (Baptista & Swann 1998; Malmberg & Power 2005; Morosini 2004; Tallman et al. 2004). This analysis reveals a favourable relationship between ICR and IC based on the current research. As a result, based on previous research, the present study proposed the following hypothesis:

> Hypothesis 1: There is a significant relationship between industry cluster resources and knowledge sharing.

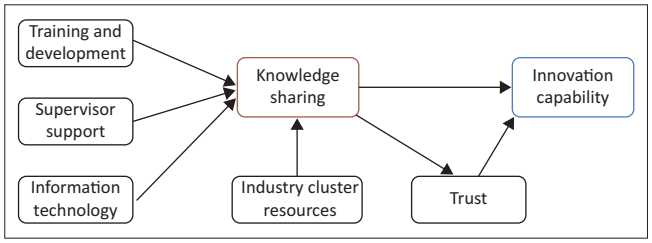


FIGURE 1: Research framework.

Information technology and knowledge sharing

Information technology is critical to every organisation's success and long-term sustainability in today's digital age. ICT has been a crucial component of the knowledge-sharing system since it aids in increasing an organisation's innovation capabilities by providing workers and staff with the tools and communication channels they require to work efficiently (Nguyen, Newby & Macaulay 2015). ICT increases productivity and helps to coordinate various activities (Tanriverdi 2005).

Furthermore, in multiple studies it has been found that the adoption of ICT significantly influences a company's innovation capabilities. According to several academics, using ICT to improve a company's innovation capabilities is essential (Liao, Fei & Chen 2007; Orfila-Sintes & Mattsson 2009; Svetlik et al. 2007). Applying ICT to the advancement of organisational activities may give firms a significant competitive edge to improving their IC (Bond & Houston 2003; Morrison, Roberts & Von Hippel 2000; Orlikowski & Barley 2001; Tatikonda & Stock 2003). According to modern analysis, ICT is essentially doing something new, which might be regarded as an IC. The following hypothesis is proposed in light of these facts and arguments:

> Hypothesis 2: A relationship exists between ICT usage and innovation capability.

Knowledge sharing and innovation capability

Several studies have demonstrated the link between KS and IC. For example, Svetlik et al. (2007) found a link between a company's information sharing and its ability to innovate. Similarly, Liebowitz (2002) found that information sharing has a positive and significant relationship with an organisation's IC. Furthermore, according to Guadamillas-Gómez and Donate-Manzanares (2011), innovation and KS are all regarding putting thoughts into action through the discovery, development, checking, and evolution of modern technologies, goods, services, and systems. Nevertheless, innovation constantly relies on knowledge because novel information is created and translated into particular knowledge to develop various commodities and services. Lin and Chen (2006) and Lin (2006) quantitatively explored the link between company KS and innovation capabilities. This research revealed that information sharing inside the business has a favourable and substantial relationship with IC. The following hypothesis has been established based on the literature as mentioned above:

> Hypothesis 3: Knowledge sharing has a significant positive relationship with innovation capability.

Trust and knowledge sharing

Individual characteristics that improve information-sharing behaviour were studied, and another individual component was identified as trust. Personnel in SMEs are driven to engage in the experience and knowledge for the reason that they like logical pleasure and solving difficulties since they trust their coworkers, according to prior studies (Chang, Gong & Peng 2012; Donate & Guadamillas 2015; Gooderham 2007; Skok & Tahir 2010; Wasko & Faraj 2000, 2005; Zack, McKeen & Singh 2009).

On the other hand, trust has no bounds and can exist vertically in an organisation's structure between managers and their lesser-grade employees (Cook & Wall 1980; McCauley & Kuhnert 1992). However, trust does not have to exist in both vertical and horizontal situations; so both upright and parallel situations must be addressed individually and independently. According to research, trust among members of the same business is necessary for effective information dissemination. For example, the study by Nelson and Cooprider (1996) clearly illustrates that trust among employees will enable them to pursue similar goals coherently. Employees will be keen to provide information at the same time and distribute information, resulting in improved organisational performance. Furthermore, Staples and Webster (2008) found that trust, KS, and effective team outcomes were all associated in another study. Similar researchers have discovered that IC is important in increasing the contribution of SMEs to GDP (Dana, Bajramovic & Wright 2005; Jiménez-Jiménez & Sanz-Valle 2011; Mansury & Love 2008). Individual variables were found to have a favourable link with information sharing in research on IC (García, Sanzo & Trespalacios 2008; García-Morales, Jiménez-Barrionuevo & Gutiérrez-Gutiérrez 2012; Gloet & Berrell 2003; Svetlik et al. 2007). As a result of the above literature, the current research suggested the subsequent hypothesis:

Hypothesis 4: There is a significant relationship between trust and knowledge sharing.

Supervisory support, training and development and knowledge sharing

Supervisory assistance has been discovered to have an important function in knowledge creation and dissemination (Connelly & Kevin Kelloway 2003). Many scholars agree with this assertion and accept the role of managerial assistance in creating a good system and atmosphere for many reasons (Lin & Chen 2006). Lin and Lee (2004) and Mary MacNeil (2004) research have both emphasised the necessity of information exchange in any company.

A company that believes in strategies regarding knowledge, understands and values that they need to invest in sufficient T&D, which is critical for boosting staff work and information communication (Bresnen et al. 2003; Scarbrough 2003; Yew Wong & Aspinwall 2005). Likewise, proponents of KS recognise and promote the importance of HRM procedures in the successful operation of information distributing actions (Grandori 2001; Foss 2007; Foss et al. 2009; Minbaeva, Foss & Snell 2009). As a result, the current study presented the following hypotheses based on the reviewed literature:

Hypothesis 5: A relationship exists between supervisory support and knowledge sharing.

Hypothesis 6: A relationship exists between training & development and knowledge sharing.

Relationship of trust and innovation capability

According to the persuasive literature, trust is critical in boosting a company's ability to innovate. According to research done in 2011, employee trust improves an organisation's ability to innovate (Wang, Yeung & Zhang 2011). In another study, trust has been discovered to boost an organisation's ability to innovate and, as a result, its performance too (Panayides & Lun 2009). According to a study, trust increases an organisation's innovation ability (Ertürk 2012). As a result of innovation, companies which prioritise trust through engaging employees, generate greater economic returns. The following hypotheses are proposed as a result of the literature review mentioned above:

Hypothesis 7: Trust has a significant positive relationship with innovation capability.

The mediating role of knowledge sharing between industry cluster resources, supervisory support, training and development, information technology, and innovation capability

Previous research studies have examined the relationship between several elements and knowledge-sharing activities. Individual, technical, and organisational issues are among them (Lin & Lee 2004; Lu, Leung & Koch 2006). In terms of the individual, information sharing is influenced by their values, beliefs, and drive. According to Wasko and Faraj (2005), employees are motivated, believing that knowledge-communicating behaviour helps them solve an issue and aid their coworkers. In the same way, when it comes to the organisational level, supervisory assistance is frequently provided to harness the advantages of a creative, supportive culture effectively. Many elements contribute to information exchange regarding SS (Saleh & Wang 1993). Similarly, the ICT part of IT leads to knowledge integration, dissemination, and sharing (Mary MacNeil 2004).

Based on the previous findings in literature, it can be stated that businesses foster knowledge exchange through the resources of industrial clusters, resulting in increased innovation capabilities (Lai et al. 2014). However, because novel information is created and translated into particular knowledge for the creation of various commodities, services and practices, IC is constantly dependent on KS (Donate & Guadamillas 2015; Gloet & Terziovski 2004). Furthermore, ICT systems are intimately linked to knowledge exchange inside a business. Every aspect of sharing information, such as seeking and acquiring it, is made possible by these platforms, allowing employees to communicate and collaborate (Huysman & Wulf 2006). The following hypotheses have been formed based on the literature mentioned above:

Hypothesis 8: Knowledge sharing mediates the relationships between industrial cluster resources and innovation capability.

Hypothesis 9: Knowledge sharing mediates the relationships between information technology and innovation capability.

Hypothesis 10: Knowledge sharing mediates the relationships between supervisory support and innovation capability.

Hypothesis 11: Knowledge sharing mediates the relationships between training & development and innovation capability.

Hypothesis 12: Trust mediates the relationships between knowledge sharing and innovation capability.

Methodology

Survey instrument and data collection

The current study employed the survey method for data collection, using a five-point Likert scale to assess the

questions, with '1' representing 'strongly disagree' and '5' representing 'strongly agreed'. The participants' IC on a six-item scale was taken from (Calantone, Cavusgil & Zhao 2002), to test the above hypotheses. The six knowledge-sharing questions were modified from research conducted by Bock et al. (2005), Sveiby and Simons (2002). Three questions from Yusof and Ismail's (2010) instrument were altered in this study to account for a component of trust. Furthermore, six questions adapted from Jayakumar and Sulthan were used to assess T&D (2014). Similarly, a five-item scale was modified by Vuki et al. (2015) to measure SS. Similarly, four questions from Choi, Lee, and Yoo's study were altered for measuring technological aspects (2010). Lai et al. (2014) performed a study that modified five items in the current study.

The target demographic is dairy farms in Punjab. The state of Punjab is the economic heartland of Pakistan. This state makes the highest contribution to the nation's GDP and has a significant economic impact (PDA 2014). Choosing Punjab means that dairy farms are accessible for data collection, while respondents are available and willing to participate in the current study. Furthermore, there are 520 dairy SMEs in the area. The sample size is 227 businesses, based on Krejcie and Morgan's (1970) formula, and 226 firms calculated to run the model. The questionnaires were sent to official email accounts. More specifically, data collection starts from the 15th of January 2020 to the 22nd of May 2020. Because of the pandemic condition throughout the study time, the current study gathered data using a GOOGLE form.

Descriptive analysis

In terms of the size of dairy farms, this demographic analysis indicated that the majority of the respondents have 16 to 26 employees in their dairy businesses. Considering the time in business (experience in dairy farming) it became clear that on many dairy farms there is only limited experience: 52.9% of the farms have been less than 05 years' in business and 33.3% of them are between 6 to 10 years old. The majority of the other respondents have even less experience. Altogether 254 dairy farms belong to the Punjab (Lahore, Multan, D.G. Khan and Faislabad) of Pakistan. Analysis of their location in the collected data revealed that the 55.9% dairy farms belong to the city of Lahore, 20.1% farms are from the Multan, 12.2% are in D.G. Khan and 11.4% from the Faisalabad.

Table 1 provides the details of the demographics profile of the respondents.

Data analysis

Partial Least Squares-Structural Equation Modeling (PLS-SEM) is a statistical technique used to examine the multivariate relationships among latent and observable variables. The rationale for using PLS-SEM for this study is that the current study is based on a complex research model with numerous variables. Moreover, the data for the current study is not multivariate normal, as it is an advantage of PLS-SEM that it also worked with non-normal data. Furthermore, PLS-SEM is used in this study as the aim is to determine the maximum explained variance of latent endogenous constructs.

TABLE 1: Descriptive analysis of demographics.

Variable name	Items	Frequency	Percent	Cumulative percent
Dairy farm type	Public dairy farm	12	4.7	4.7
	Private dairy farm	242	94.9	100.0
Dairy farms status	Declining	137	53.7	53.7
	Growing	117	46.3	100.0
Size of dairy farm	Employee ≤ 15	87	34.1	34.3
	Employee 16–25	131	51.5	85.8
	Employee ≥ 26	36	14.2	100.0
Age of dairy farms	Less than 5	135	52.9	52.9
	6–10 Years	85	33.3	86.2
	11–14 Years	19	7.5	93.7
	More than 15 years	15	6.3	100.0
Location of dairy farms	Lahore	142	55.9	55.9
	Multan	52	20.1	76.0
	D.G. Khan	31	13.2	88.6
	Faisalabad	29	11.4	100.0

Common method variance

Generally, common method variance (CMV) occurs when the data have been collected at one point of time and in a self-reported questionnaire survey. For this study, Herman's single factor test has applied to analyse the maximum variance among all the constructs. The analysis revealed that maximum 20.78% variance was accounted for a single factor which is below 50% threshold value. The results for CMV revealed that the common method bias is not an issue in this study.

Analysis and findings

Table 2 presents the assessment of the measurement model. The parameters used to test the measurement model are factor loadings, Cronbach's Alpha (CA), composite reliability (CR), and Average Variance Extracted (AVE). The factor loadings are above the standard threshold of 0.7, except for a few of the items which are below 0.7 but still exceeding 0.5 and can be retained in the model (Noor et al. 2020). Moreover, CA and CR have exceeded the stringent cut of point 0.7. Finally, the AVE scores are above 0.5. Thus, the article has demonstrated internal consistency reliability.

It describes the measurement or outer model in this part. The model assesses each variable's component or item, which indicates how effectively the indicators (items) load conceptually and connect with related constructs, as shown Table 2.

To begin, internal consistency is often used to assess the consistency of outcomes across questions on the same exam. It estimates whether the proposed items to evaluate the construct, produce comparable results (Hair et al. 2014). The CR, AVE surpassed the necessary threshold of 0.5; therefore, the article explained the internal quality index enough (Hair

TABLE 2: Convergent validity.

Construct	Item	Loadings	Cronbach's alpha	Composite reliability	Average variance extracted
Innovation capability	IC2	0.853	0.842	0.883	0.558
	IC3	0.667	-	-	-
	IC4	0.694	-	-	-
	IC5	0.811	-	-	-
	IC6	0.716	-	-	-
Industry cluster resource	ICR1	0.808	0.794	0.862	0.611
	ICR2	0.760	-	-	-
	ICR3	0.793	-	-	-
	ICR4	0.764	-	-	-
Knowledge sharing	KS2	0.657	0.705	0.819	0.532
	KS3	0.770	-	-	-
	KS4	0.727	-	-	-
	KS5	0.758	-	-	-
Supervisory support	SS1	0.777	0.787	0.854	0.054
	SS2	0.739	-	-	-
	SS3	0.759	-	-	-
	SS4	0.759	-	-	-
	SS5	0.628	-	-	-
Training and development	TD1	0.694	0.815	0.862	0.513
	TD2	0.591	-	-	-
	TD3	0.687	-	-	-
	TD4	0.755	-	-	-
	TD5	0.770	-	-	-
	TD6	0.783	-	-	-
Trust	TR1	0.803	0.075	0.856	0.665
	TR2	0.868	-	-	-
	TR3	0.772	-	-	-
Information Technology	IT1	0.719	0.778	0.855	0.595
	IT2	0.772	-	-	-
	IT3	0.790	-	-	-
	IT4	0.802	-	-	-

et al. 2017), and CA, of unobservable constructions, are shown in Table 2.

The discriminant validity has been assessed through the Fornell-Larcker criterion (shown in Table 3) and Heterotrait-Monotrait (HTMT) ratio (shown in Table 4).

Assessment of the structural model

Previously, the reliability and validity tests were carried out to validate the results of the measuring model or outer model. Before executing the structural model, the current investigation used VIF (Hair et al. 2014). Figure 3 depicts the study's structural model results. The result shows no issue with multicollinearity between the explanatory variables after running the VIF. Table 5 illustrates that the VIF values are smaller than the benchmark (5). As a result, the results show no multicollinearity between explanatory variables in the structural model. After that, the present studys hypotheses was tested using bootstrapping approaches with 5000 sub-samples (to validate the efficacy of the path coefficients) and to analyse the direct and indirect relationships of the constructs.

According to the results in Table 6, ICR has a substantial influence on KS (β = 0.188; t = 3.134; p > 0.05); thus, H1 is

TABLE 3: Fornell and Larcker.

Construct	ICR	IT	IC	KS	SS	T&D	Trust
ICR	**0.782**	-	-	-	-	-	-
IT	0.223	**0.772**	-	-	-	-	-
IC	0.232	0.373	**0.747**	-	-	-	-
KS	0.316	0.351	0.409	**0.729**	-	-	-
SS	0.211	0.377	0.283	0.489	**0.735**	-	-
T&D	0.184	0.404	0.364	0.330	0.308	**0.716**	-
Trust	0.268	0.248	0.251	0.245	0.265	0.092	**0.815**

ICR, Industrial cluster resource; IT, Information technology; IC, Innovation capability; KS, Knowledge sharing; SS, Supervisory support; T&D, Training and development.

Note: All the values shown in diagonal and bold represent the square root of AVE, while those of the diagonal represent the latent variable correlations.

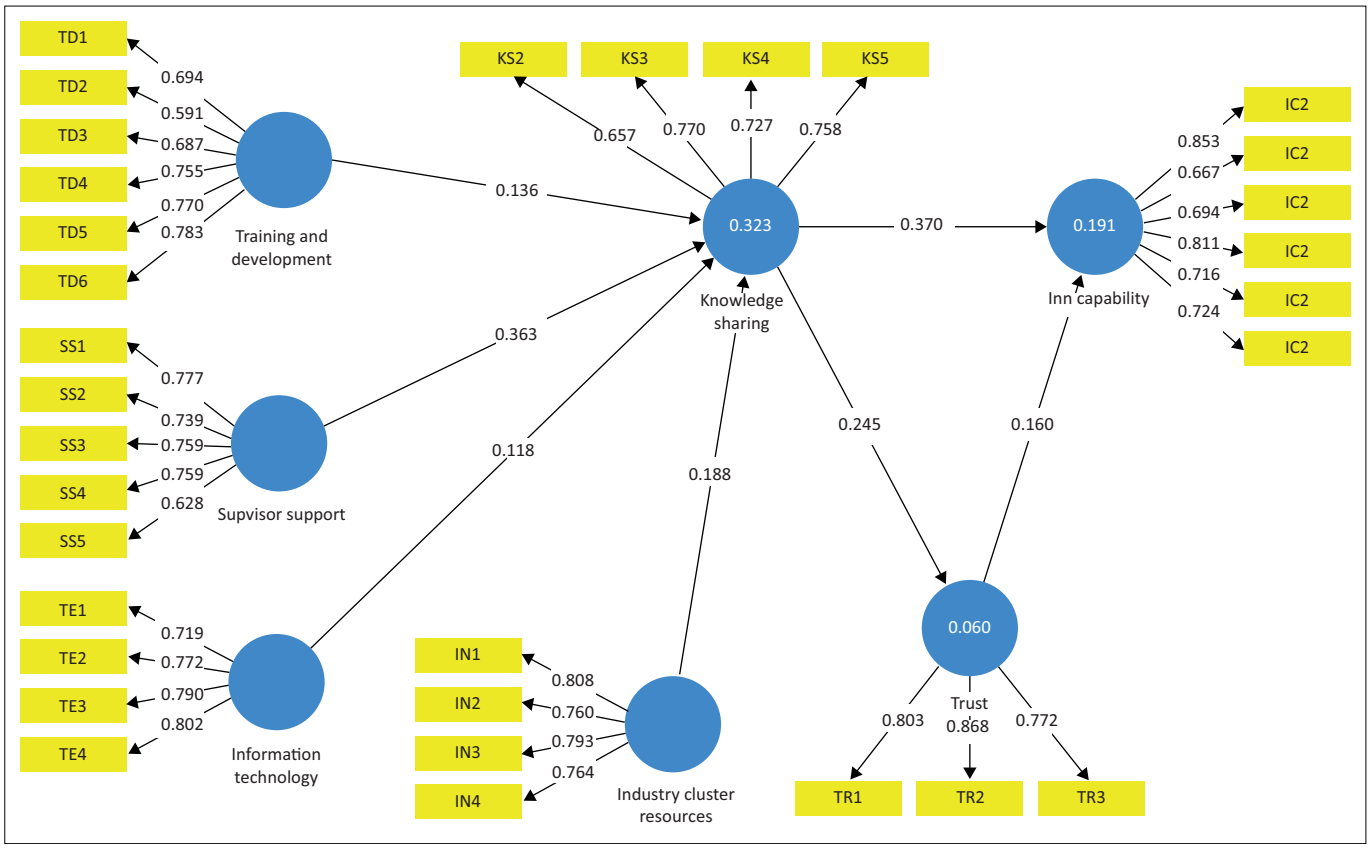
TABLE 4: Hetrotrait-Montrait ratio.

Construct	ICR	IT	IC	KS	SS	TD	Trust
ICR	-	-	-	-	-	-	-
IT	0.284	-	-	-	-	-	-
IC	0.271	0.451	-	-	-	-	-
KS	0.039	0.046	0.505	-	-	-	-
SS	0.268	0.459	0.342	0.646	-	-	-
T&D	0.228	0.051	0.398	0.399	0.366	-	-
Trust	0.325	0.307	0.322	0.325	0.342	0.126	-

ICR, Industrial cluster resource; IT, Information technology; IC, Innovation capability; KS, Knowledge sharing; SS, Supervisory support; T&D, Training and development.

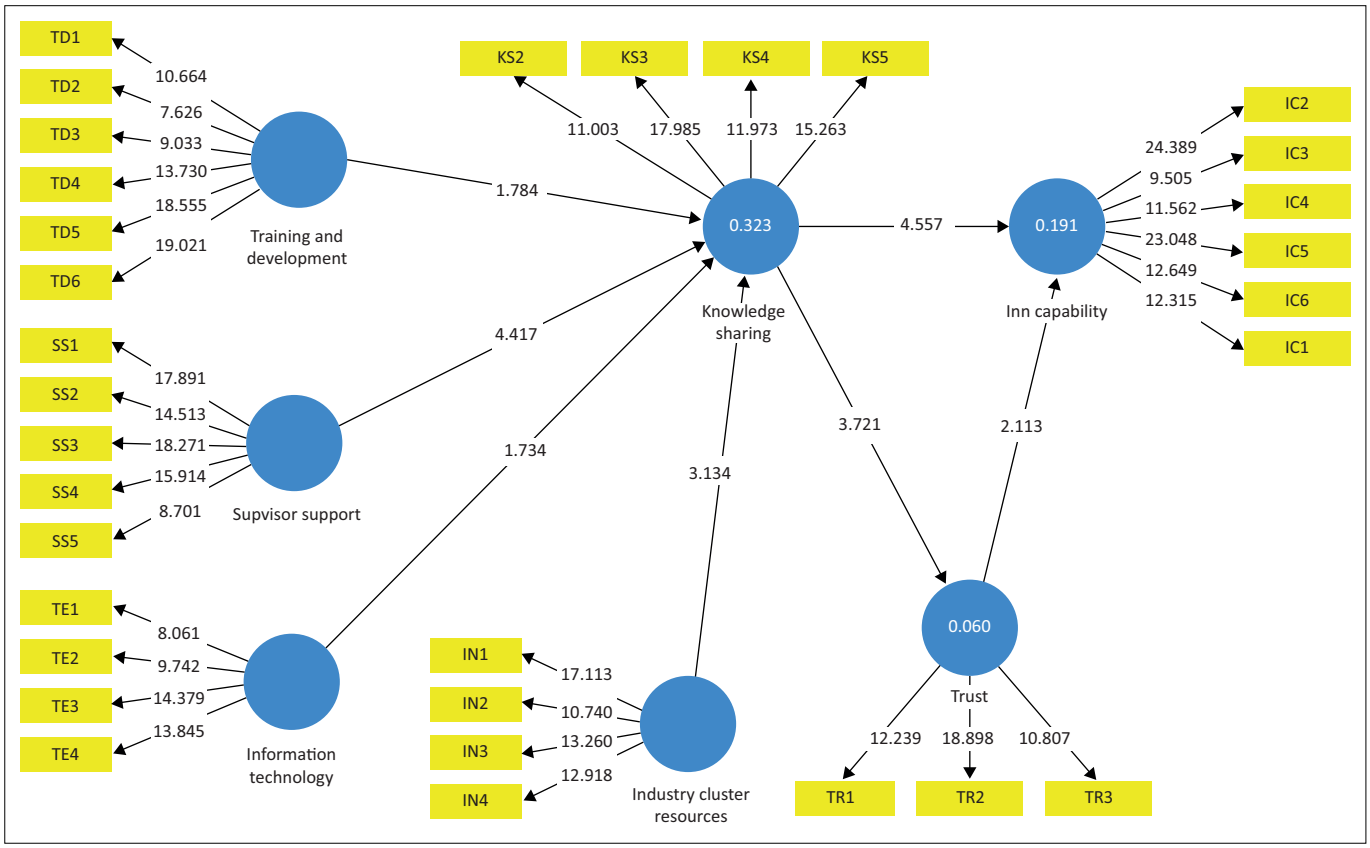
supported (*There is a significant relationship between industry cluster resources and knowledge sharing*). Similarly, H2 (*A relationship exists between ICT usage and innovation capability*) is supported since the results show that IT substantially influences KS (β = 0.118; t = 1.734; p 0.05). H3 (*Knowledge sharing has a significant positive relationship with innovation capability*) is likely to have a substantial influence on KS on IC (β = 0.370; t = 4.557; p 0.05). Hence, H3 is supported. In terms of H4 (*There is a significant relationship between trust and knowledge sharing*), the results show that KS has a substantial influence on trust (β = 0.245; t = 3.721; p 0.05). Hence H4 is supported as well. With the statement of H5 (*A relationship exists between supervisory support and knowledge sharing*), the outcome shows a positive link between SS and KS (β = 0.363; t = 4.417; p 0.05). Similarly, H6 (*A relationship exists between training & development and knowledge sharing*) is corroborated by the substantial influence of T&D on KS (β = 0.136; t = 1.784; p < 0.05). Lastly, there is a significant relationship between trust and IC which supported H7 (*Trust has a significant positive relationship with innovation capability*) (β = 0.160; t = 2.113; p < 0.05).

Furthermore, the mediating impact of KS and trust is depicted in Table 6. H8 (*Knowledge sharing mediates the relationships between industry cluster resources and innovation capability*) dealt with KS's mediation with ICR and IC (β = 0.070; t = 2.866; p < 0.05). H9 (*Knowledge sharing mediates the relationships between information technology and innovation capability*) is about the mediation impact of KS on IT and IC, which is not statistically significant with values (β = 0.044; t = 1.575; p > 0.05). H10 (*Knowledge sharing mediates the relationships between supervisory support and innovation capability*) analysed the mediation of KS between SS and IC and is supported (β = 0.134; t = 3.681; p < 0.05). Furthermore, H11 (*Knowledge sharing mediates the relationships between training & development and innovation capability*) was about the mediation connection of KS with T&D, and IC was



Note: Inn capability, Innovation capability.

FIGURE 2: Measurement model.



Note: Inn capability, Innovation capability.

FIGURE 3: Structural model.

TABLE 5: Direct effect of hypotheses.

Hypotheses	Hypothesised path	Path coefficient	STDEV	*T*	*P*	Decision	0.005	0.095	VIF	*R* square	R^2	*F* square
H1	Industry cluster resources → Knowledge sharing	0.188	0.060	3.134	0.001	Supported	0.066	0.267	1.081	Innovation capability	0.19	0.048
H2	Information technology → Knowledge sharing	0.118	0.068	1.734	0.042	Supported	0.013	0.213	1.325	Knowledge sharing	0.32	0.015
H3	Knowledge sharing → Incapability	0.370	0.081	4.557	0.000	Supported	0.238	0.499	1.000	Trust	0.06	0.064
H4	Knowledge sharing → Trust	0.245	0.066	3.721	0.000	Supported	0.124	0.337	1.064	-	-	0.159
H5	Supervisory support Knowledge sharing	0.363	0.082	4.417	0.000	Supported	0.224	0.005	1.225	-	-	0.158
H6	Training & development → Knowledge sharing	0.136	0.076	1.784	0.037	Supported	0.007	0.254	1.245	-	-	0.022
H7	Trust → Innovation capability	0.160	0.076	2.113	0.018	Supported	0.025	0.276	1.064	-	-	0.003

Note: STDEV, Standard deviation, VIF, Variance inflation factor.

TABLE 6: Mediation test summary.

Hypotheses	Hypothesised path	Path coefficient	Std error	*T*	*P*	Decision	0.005	0.095
H8	Industry cluster resources → Knowledge sharing → Innovation capability	0.070	0.024	2.866	0.002	Supported	0.031	0.111
H9	Information technology → Knowledge sharing → Innovation capability	0.044	0.028	1.575	0.058	Not supported	0.003	0.089
H10	Supervisor support → Knowledge sharing → Innovation capability	0.134	0.036	3.681	0.000	Supported	0.081	0.195
H11	Training & development → Knowledge sharing → Innovation capability	0.050	0.035	1.413	0.079	Not supported	0.004	0.128
H12	Knowledge sharing → Trust → Innovation capability	0.039	0.024	1.667	0.048	Supported	0.008	0.078

not significant with the results (β = 0.050; t = 1.413; $p > 0.05$). Finally, H12, (*Trust mediates the relationships between knowledge sharing and innovation capability*) the function of trust as a mediator between KS and IC was supported (β = 0.039; t = 1.667; $p < 0.05$).

The coefficient of determination (R^2) is often the used measure for evaluating the variance of endogenous variables explained by exogeneous variables (Henseler et al. 2014). Chin (1998) stated the specific ranges for R^2 values, which are 0.19, 0.33, and 0.67 for weak, moderate, and substantial effect. In this study, Table 5 shows that the R^2 values of IC (0.19 as weak), KS (0.32 as weak), and trust (0.06 as very weak). The effect of size (f^2) is the second criterion for evaluating the model which is calculated as the increase in R^2 of the latent variable (LV) to which the path is connected, relative to the LV's proportion of unexplained variance. Cohen (1988) provided the threshold values for f^2, which are 0.02, 0.15, and 0.33 for small, medium, and substantial effect size. Table 5 shows the values of effect size (f^2) for the current study.

Discussion and conclusion

The discussion will focus on how trust, incentive, supervisory support, IT, and ICRs influence expected KS and innovation capabilities. The ICR are a novel organisational structure that accelerates development and innovation. The concept is based on the industry cluster resources and ability to innovate. This finding emphasises the value of ICR in fostering innovation. Businesses can increase innovation potential for new goods, while cutting costs by utilising cluster resources. They can also boost their competitiveness by developing efficient techniques and cultivating expert labor. As a result, having ICR available, has a favorable impact on the IC.

The findings support the T&D hypothesis and the knowledge exchange hypothesis. Individuals and organisations have increased their talents and skills to conceive and convey new ideas, demonstrating that T&D for employees are helpful and have an impact on KS. According to the study's findings, T&D link employees to new ideas, allowing the organisation to improve and alter the ideas. This research shows that supervisory help considerably impacts IC and KS.

According to prior researchers, new technology is key in enhancing a company's profitability and vitality. Moreover, several studies have shown that technological advancement is crucial to a company's innovative capability. Furthermore, the connection between IT and IC shows that every technological advance boosts IC and the relationship between KS and innovation capabilities. The hypothesis indicates that KS is an essential source of IC. As a result, dairy farms and enterprises are looking for new ways to expand their creative talents, including technology innovation. Businesses should establish information-sharing mechanisms encouraging innovation, such as boosting finances for practical training to transfer knowledge across dairy farms and generations.

Implications of the study

Several businesses seek to build information sharing but are oblivious to the significance of KS in developing IC. The current study has tested two mediators in one multivariate model between trust, motivation, T&D, SS, ICT use, as well as ICR and IC. The study's findings explained next, have a wide range of practical and theoretical consequences for enhancing innovative capacities. In terms of KS and IC, the current study's findings can help dairy farms' understanding and practice. The following recommendations are made to

dairy farm owners, and managers increase IC through successful KS.

Limitation of the current study

The current study has a few drawbacks that should be addressed in future studies. Firstly, the recent study's findings cannot be generalised because the present study was conducted in Pakistan. On the other hand, the researcher argues that including whole-industry data could make the research more relevant in generalising the findings. On a global scale, the current study can also be opted for by using cross-country respondents from other developing countries.

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Competing interests

The authors have declared that no competing interest exist.

Authors' contributions

All authors contributed equally to this work.

Ethical considerations

This article followed all ethical standards for research without direct contact with human or animal subjects. This study used two remedial procedures as bias control approaches and for ethical consideration. Firstly, it is ensured that the language of the questions in the questionnaire is simple and precise to avoid vague concepts for respondents. Secondly, the confidentiality of respondents was also ensured.

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Data availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Disclaimer

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